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ABSTRACT

The modern polytechnic college is an outgrowth of changes made in engineering curricula toward more theoretical and less practical applications oriented engineering science. A February 1985 survey revealed that there are currently 68 public, 17 private non-profit, and 7 for profit polytechnics in the U.S. Only 17 of these institutions are considered single-purpose polytechnic colleges, whereas 75 are either schools or colleges in comprehensive institutions. The polytechnics use three forms of program structure: (1) the inverted curriculum (or "two plus two"), where an intensive associate degree engineering program is offered for the first 2 years and a baccalaureate degree is offered for 2 additional years of general education and advanced skills courses; (2) the "plus two" curriculum, which offers only the upper division 2 years; and (3) the "generic four" curriculum, which is structured like most baccalaureate programs. Survey findings indicate that 37 institutions use the inverted structure, 13 the "plus two" structure, and 42 the "generic" structure. Approximately 6,200 former community college students were enrolled at the institutions surveyed, representing 10% of total enrollments. For the most part, the modern polytechnic college exists in a program structure that is conducive to close coordination of student transfer from community and technical colleges. By increasing coordination of programs and curricula, community, technical, and polytechnic colleges can satisfy new demands for high technology training in a cost-effective manner with a minimum of duplication. A brief description of Oregon Institute of Technology is included. (AYC)

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THE MODERN POLYTECHNIC COLLEGE: A NEW PARTNER FOR COMMUNITY COLLEGES

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THE MODERN POLYTECHNIC COLLEGE: A NEW PARTNER FOR COMMUNITY COLLEGES

Since World War II and particularly during and after the rapid expansion days of the community college movement in the 1960's, curricular offerings have been generally divided into college transfer, terminal vocational/technical, adult basic, and community service programs.

However, employment trends in the technological revolution and the availability of new partnerships are causing the so-called "terminal" nature of technical programs to be re-examined. Particularly in the fields of engineering technology, technicians with Associate degrees are being encouraged to return to college and obtain a baccalaureate degree. If such graduates approach a college of engineering, they are informed that, after three or three and one-half years of full-time study, they should be able to obtain a Bachelor of Science degree. In recent years, however, with the rapid growth in the number of engineering polytechnic colleges, a new option is available to such individuals where only two, or slightly more years, are necessary for such a baccalaureate degree.

The Modern Polytechnic

The modern polytechnic college or university (herein defined as an institution with one or more accredited baccalaureate

degrees in engineering technology) is an outgrowth of changes made in the curricula of engineering programs during the late 50's and early 60's (for a more concise history of engineering technology see L. E. Grinter, "Engineering and Engineering Technology Education," Journal of Engineering Technology, March, 1984). During this timespan, such colleges emphasized a change toward more theoretical engineering science and de-emphasized the practical, applications nature of previous engineering programs. This process culminated in the separation of accreditation by ABET (Accreditation Board for Engineering and Technology) into separate accreditation for engineering and engineering technology curricula in 1967. The number of colleges or universities offering engineering technology programs grew from one in 1967, to 12 in 1970, to 45 in 1975, 83 in 1980, and 94 in 1984. During the fall 1984 term, they enrolled over 63,000 students in baccalaureate programs and granted over 12,000 baccalaureate degrees during the previous year. They are found in 38 states with a majority of the remaining states being sparsely populated western states.

Forms of the Polytechnic

The modern polytechnic in the United States can be classified into three distinct forms or categories, namely: type of support, emphasis, and program structure. (See following table).

TABLE 1.
U.S. POLYTECHNIC COLLEGES
April, 1985

Funding	Emphasis*	Program Structure: Inverted	Plus Two	Generic	Total
Public	School	21 (2)**	10	33 (5)	64
	Total	2	1	1	4
Private	School	2	2	7	11
	Total	5		1	6
For Profit	School				
	Total	7 (6)	—	—	7
		37	13	42	92

*School is part of a comprehensive institution; total is single purpose polytechnic.

**Numbers in () represent colleges not accepting community college graduate transfers, all others do.

The 92 institutions responding to a February, 1985 survey (two of the 94 accredited institutions are phasing out engineering technology) are classified for support purposes as public (68), private non-profit (17), and for profit (7).

In terms of emphasis, only 17 of the institutions can be classified as totally a single purpose polytechnic college whereas the vast majority (75) are either a school or college or a part of such in a much more comprehensive institution.

Finally, in terms of program structure, there are three forms. The first is the inverted curriculum (or two plus two) where an Associate degree is offered for the first two years and a baccalaureate degree for two additional years. The inverted

terminology is used since, during the first two years, students take an intensive program in the technology of the curriculum resulting in an Associate degree similar to those offered at many community colleges, while the second two years consists of the majority of the general education undertaken, advanced technical skills, and other related subjects. The second form, called the "plus two" curriculum, is similar to the inverted, but offers only the upper division two years depending, for admission, upon students who have already completed an Associate degree elsewhere, generally in a community college. The final form is known as the "generic four" and is structured similar to most baccalaureate programs, inasmuch as general education and related subjects are taken in the first two years with the technologies reserved for the last two years.

In terms of numbers, there are currently 37 colleges utilizing the inverted curriculum, 13 with the plus two and 42 with the generic four. The more rapidly growing sector is the plus two which comes as a result of the growing trend toward cooperative programming with existing community college programs.

Although this paper emphasizes the areas of engineering technology, many polytechnics also offer programs in the business, industrial, and health technologies, many in the inverted or plus two forms.

An Example, OIT

An example of a modern polytechnic would be Oregon Institute of Technology, the only such college north of California

Polytechnic State University in San Luis Obispo and west of Weber State College and Brigham Young University in Utah. Oregon Tech offers all of its engineering technology programs in the inverted curriculum structure and a majority of its business, health, and industrial technology programs in a similar structure. It offers engineering technology programs in Civil, Computer Systems, Electronics, Laser Electro-Optics, Manufacturing, Mechanical, Software, and Surveying. It offers business programs in Accounting Technology, Industrial Management, and Office Systems Technology, an industrial program in Diesel Power Technology, and health programs in Dental Hygiene, Medical Radiologic Technology, Medical Technology, and Nursing.

It enrolls over 2,600 students with 50% in engineering technologies, 17% in health technologies, 11% in business technologies, and 7% in Diesel Power Technology. Although located in Klamath Falls, Oregon, it recently opened a plus two program in Portland. Its major strengths are its relationships with business and industry, its placement, and its faculty. In addition to curriculum advice, placement assistance, and lobbying, business and industry donated over $1.6 million worth of equipment and software during the calendar year 1984. Regarding placement, Oregon Tech has placed over 97% of its graduates immediately before or after graduation for the past two years and has regularly placed over 95%. Faculty, in all programs, must possess a Master's degree and substantial business and industrial experience.

Relations with Community Colleges

The recent survey pointed up a growing coordination of programs, curricula, and student transfer amongst modern polytechnics and community and technical colleges, particularly with the inverted and plus two program structures (See Table 1.). From the responses, it is estimated that approximately 6,200 former community and technical college students are enrolled in baccalaureate programs at the 94 institutions surveyed, representing approximately 10% of total enrollments. Only thirteen such polytechnics indicated that they did not accept two year community college graduates into their programs, seven in the generic structure, plus the six campuses of the DeVry Institutes of Technology, however, this data may be somewhat soft inasmuch as it represents ambivalence as to whether they were responding to the question such that they accept such graduates as junior students or whether they require some sophomore work to be taken prior to full junior status. It should also be noted that, with good program coordination, transfer to full junior standing can be easily accomplished with the polytechnics in the inverted and plus two program structures whereas some or considerable problems may be anticipated in such transfer to generic program structures.

A Conclusion

The modern polytechnic college, a relative newcomer on the U.S. educational scene, exists in a program structure, for the most part, conducive to close coordination of transfer of

students from technical programs at community and technical colleges. As programs in all forms of higher education are increasingly being defined in interdependent ways, the growing partnership between these institutions ought to be enhanced.

Also, as the rapidly growing employment area of high technology and its applications to all other areas of employment increases, there will continue to be a greater need for increased education and training on the part of future employees. By increasing their coordination of programs and transfer, community, technical, and polytechnic colleges can satisfy these new demands in a cost-effective manner with a minimum of duplication.

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